

REMARKS

In a telephone interview with Examiner Vy and Examiner Scott on July 31, 2003 applicant's undersigned attorney addressed the following points directed to the prior art. Also in the interview the Examiners suggested formal amendments to the claims which do not impact on the prior art rejections. Although no agreement was reached, the Examiners suggested a continued prosecution.

In filing the present request for continued prosecution, applicant also address several formal amendments to the claims suggested by the Examiners, which do not relate to the patentability over the prior art. Namely, applicant has replaced the "active or non-linear material" language with "a first material taken from the group consisting of an active material and a non-linear material." Additionally, the term "plasma" has been removed from the claims pursuant to the Examiners' request. Since all of the present amendments to the claims relate solely to formal matters, the amendments do not have a prosecution estoppel effect.

Turning to the substantive matters raised in the Office Action, the Examiner rejected Claims 1, 6, 9-13 and 15-30 under 35 U.S.C. §102(b) as being anticipated by Kawabata et al., (Pub. No. 2001/0040679) (hereinafter "Kawabata et al.") or Scherer et al. (U.S. Patent No. 6,534,798) (hereinafter "Scherer et al."). Additionally, the Examiner rejected Claims 2-5 and 7-8 under 35 U.S.C. §103(a) as being unpatentable over Kawabata et al. or Scherer et al. Reconsideration is respectfully requested.

The present claimed invention is directed to an optical structure for processing optical energy comprising a metal layer having **a plurality of voids with a dimension less than the wavelength of optical energy being processed**, an **active or non-linear material** adjacent at least a portion of the metal layer in the area of the voids, wherein the voids exhibit **localized resonances**, and a substrate for supporting the metal layer. Applicant respectfully submits that these features are not disclosed or suggested by the cited references.

With respect to the Kawabata et al. reference, the Examiner first cited Figure 1 to show that "Kawabata et al. discloses an optical structure for processing optical energy comprising a metal layer (22) having a first surface comprising a plurality of voids..." However, a careful review of Kawabata et al. shows that **it is not a metal**

layer of Kawabata et al. which has the voids, but rather the semiconductor substrate 21. (See Kawabata et al. Figure 1 and page 4, paragraph [0044].)

Since Kawabata et al. does not describe or suggest placing voids in a metal of layer 22, but only in the semiconductor substrate 21, it fails to meet a critical feature of the present claimed invention and should be removed as a reference under both §102(b) and §103(a).

Although the failure of Kawabata et al. to disclose or suggest voids in a metal layer is compelling to remove it as a reference, Kawabata et al. also fails as a reference because it fails to disclose or suggest the use of active or non-linear material or the exhibition of localized resonances. In this regard, Kawabata et al. does not even remotely suggested an active or non-linear material anywhere in the reference and there is nothing found in the Kawabata et al. reference which leads to this conclusion. Similarly, there is nothing disclosed or suggested in Kawabata to infer a localized resonance from the structure. As such, the Kawabata et al. reference fails on several grounds, confirming that removal of the reference is proper.

Turning to the Scherer et al. reference, although this reference may show a metal layer having voids therein, there is no disclosure or suggestion of the voids having a dimension less than the wavelength of the optical energy being processed or that localized surface plasma resonances will be exhibited, as presently claimed.

With respect to the failure of Scherer et al. to disclose or suggest voids with a dimension less than the wavelength of the optical energy to be processed, Scherer et al. describes processing 986 or 930 nm light (col. 10, lines 13-15) from the semiconductor. Since the optical energy for processing at the metal layer is from the semiconductor, the wavelength is divided by the refractive index of the semiconductor, which is about 3.5 for the GaAs of the semiconductor membrane (986nm/3.5 or 930nm/3.5). Therefore, the wavelength of the optical energy being processed at the voids in Scherer et al. is about 280 or 2650 nm, respectively.

On the other hand, Scherer et al. calls for holes having a radius of 210nm, i.e., a dimension of 420 nm (col. 14, lines 4-6). Obviously, where the wavelength of the optical energy being processed is about 280 nm and the holes in the metal layer of Scherer et al. are 420 nm, the dimension of the voids is not less than the wavelength of

the optical energy being processed, as presently claimed. As such, Scherer et al. fails to disclose or suggest the present claimed invention.

Additionally, the Scherer et al. reference fails to anticipate or render obvious the present claimed invention wherein it does not disclose or suggest a localized resonance. In this regard, Scherer et al. refers to a one-dimensional grating, shown in Figure 2 of Scherer et al., which does not exhibit a localized resonance but rather interacts with a propagating wave. The scattering of the propagating wave from the one-dimensional grating of Scherer et al. teaches away from the localized resonance presently claimed. Moreover, the failure of Scherer et al. to mention any localized resonance leads to the conclusion that it is not of significance to Scherer et al and no suggestion can be drawn from the reference.

With respect to the Examiner's statement that the sub-wavelength holes, the active or nonlinear material and localized resonance are inherent, applicant respectfully disagrees.

To establish inherency, the extrinsic evidence must make clear that the missing descriptive material is necessarily present in the thing described in the reference and that it would be recognized by one of ordinary skill in the art. See, *In re Robertson*, 49 U.S.P.Q.2d 1949 (Fed. Cir. 1999). Here, however, it is clear that the description of a one-dimensional grating in the Scherer et al. reference does not provide localized resonances. Moreover, not all holes used in a metal layer necessarily exhibit localized resonances. As such, localized resonances are not inherent in the cited references and therefore anticipation cannot be found.

Additionally, where the references only disclose holes larger than the wavelength of the optical energy being processed, it cannot be said that sub-wavelength voids are inherent. Clearly, sub-wavelength holes are not necessarily present, as required for a finding of inherency under the law. Therefore, it cannot be said that the claimed features referred to in the Office Action are inherent in the references.

Finally, with respect to the rejection of Claims 2-4 and 7-8 under §103(a) over Scherer et al., the Examiner stated that the claimed voids being cylindrical and in a triangle array would have been obvious from the reference. Applicant respectfully traverses, wherein Scherer et al. specifically calls for a square array of holes with a hole radius of 210 nm having a 100nm pinhole in the center thereof (col. 13, line 66-col. 14,

line 6). Thus, Scherer et al. calls for a cup shaped void, not a cylinder, without any suggestion of a cylinder as the configuration of the void. As such, there is no motivation for the modification set forth by the Examiner and the rejection thereover should be removed.

Based on the foregoing, applicant respectfully submits that neither the Kawabata et al. nor the Scherer et al. reference anticipates the present claimed invention. More particularly, where the use of sub-wavelength size holes in the metal layer is required in each of the present claims, they are not anticipated or rendered obvious by the cited references. Additionally, Claims 1-13 and 15-17 are further patentable over the cited references wherein they call for localized plasma resonances exhibited from the voids in the metal layer.

Furthermore, the deficiencies of the cited reference are not cured by combination with the additional art cited by the Examiner in the present application. Applicant therefore submits that the subject matter of the present claimed invention is patentable over the cited prior art.

Based on the above, applicant respectfully submits that all of the pending claims are allowable over the cited references. Favorable consideration and early allowance of all of the pending claims is respectfully requested and earnestly solicited.

Respectfully submitted,



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